Amides are pervasive in nature and technology as structural materials which could be easily obtained from natural amino acids. Based on the strategy of bifunctional activation, we introduced Lewis base functional groups, such as N-oxide and guanidine, into chiral amide group to construct new organocatalysts or ligands.

C2-symmetric N,N'-dioxide could serve as both organocatalysts in asymmetric cyanosilylation reactions, chlorination of β-keto esters with NCS, and chiral ligands. Powerful chiral N,N'-dioxide-metal complex catalysts have realized numbers of asymmetric transformations. Recently, the first highly efficient asymmetric Roskamp reaction of -alkyl-β-diazoesters with aromatic aldehydes,1 and asymmetric bromoamination of chalcones2 have been discovered by N,N'-dioxide-Sc(III) complex. The desired enantioenriched products could be afforded with 0.01-0.05 mol% catalyst loading.

The molecular containing guainidine and amide group could also perform as efficient bifunctional organocatalysts. Asymmetric 1,4-addition of β-ketoesters to nitroolefins demonstrate high stereoselectivities and yields.3 An unexpected inverse-electron-demand Diels-Alder reaction of chalcones with azlactones has been realized by C2-symmetric bisguanidine catalyst.4 Chiral γ,δ-unsaturated δ-lactones containing a quaternary stereocenter were performed in excellent stereoselectivities with minor Michael adduct.

CBC SEMINAR ANNOUNCEMENT

Professor Feng Xiaoming
College of Chemistry, Sichuan University

Amide-based N,N’-dioxide and Bisguanidine Catalysts in Asymmetric Reactions

Date: 26th November 2010 (Friday)
Time: 11am – 12.15pm
Venue: NTU SPMS CBC Building Level 2, Conference Room
Host: Professor Loh Teck Peng